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**MOUNTAIN AGRICULTURE WITH  
FOCUS ON UTTARANCHAL**

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# **MOUNTAIN AGRICULTURE WITH FOCUS ON UTTARANCHAL\***

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## **INTRODUCTION**

Uttaranchal, situated in the Central Himalayan Zone is among the most underdeveloped states of India. The geographical area of Uttaranchal extends for over 53.4 thousand sqr. Kms. and is inhabited by about 8.5 million people. Its economy is predominantly based on agriculture and other related activities. Hence, the population of Uttaranchal is mainly depending upon agricultural activities both for employment and livelihood, though these activities are not in a position to provide full time gainful employment to the labourforce and the sufficient income for maintaining the livings of households. Yet, the pressure of population is consistently increasing on it due to non-availability of employment and the sources of income generation outside agricultural activities.

The economy has been experiencing a growth rate of less than three per cent, around one half of the national levels, for last over a couple of decades. Accounting only for commodity producing sectors, agriculture including animal husbandry and fishing is contributing a major share of over 67 per cent, as against 20 per cent manufacturing.

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9 per cent forestry and logging and 5 per cent mining and quarrying in the net output of the state. However, the NDP generated from mining and quarrying, is estimated to be increasing fastly and at highest rate (26 per cent) as compared to remaining economic sectors, it is 3.50 per cent for agriculture with a negative growth rate of 6.04 per cent per annum for forestry and logging. The agricultural activities are visualised playing a dominating role in the overall economy of the state but significantly at higher level in purely hilly districts as compared to districts which sizeable part of geographical area is covered by plain areas. This is found in terms of both absorbing labourforce and the contribution of income. Since, in the purely hilly districts, the contribution of agriculture in the total NDP is ranging as higher as 85 per cent to lowest at 63.41 per cent and the proportion of labourforce engaged on it varied between 75 per cent to 85 per cent across the districts.

In the past significant attention has been provided for enhancing the productivity of lands so as to increase the crop production through allocating over three fourth of the total plan outlay for agricultural sector during different plans and providing a greater emphasis towards ensuring the supply of various agricultural inputs such as improve variety seeds, fertilizers, pesticides and plants protection technologies to the farmers through the establishment of supply centres at easily accessible distances. As a result the production and yield rates of the major food crops has increased at least some extent, though mostly in valley and irrigated areas of purely hilly districts and plain part of the state, in the past. However, little impact of using improved agricultural practices on enhancing the productivity of various crops was observed in purely hilly and mountainous areas of the state. Over and above, it has universally been recognised that the development of agriculture, in terms of enhancing per hectare productivity of foodgrains is hardly possible



beyond a point because of certain topographical problems, nature of terrain, dominance of existing scattered, marginal and steep sloppy land holdings, scanty cultivated land and difficult agricultural conditions. The use of improved variety seeds, modern fertilizers, pesticides and chemicals, which can boost the production and yield rates of crops, cannot be applied in un-irrigated agricultural lands. As only 36 per cent of the cultivated land area is possessing the facility of irrigation in Uttaranchal. In fact, in purely hilly districts all together, the irrigated land area is constituted only 10.28 per cent.

## LAND USE PATTERN

In Uttaranchal, a major land area is reported under the forest cover while only 12.36 per cent land is brought out under the cultivation of different agricultural crops, vegetables and growing of fruits. In fact a sizeable proportion of net area sown for cultivation is under-utilised by the farmers for growing agricultural crops regularly for every year as the farmers are practicing to leave some parcel of lands, mostly un-irrigated land area, uncultivated for at least one crop season for alternative year for the purpose of regaining its fertility. Such tendency of leaving land uncultivated as fallow is seen increasingly developing among the farmers over the years in the purely hilly districts. And, thus, out of 663 thousand hectares land area reported as cultivated land, only 437 thousand hectares of it, accounting for 8.14 per cent of the net area sown, is found actually being utilised for the production of foodgrains and horticultural produce during both Kharif and Rabi crop seasons regularly.

Carrying out agricultural activities in the state has been well proved as an un-economic affair. But, the lacking opportunities of employment in other economic sectors the

labourforce are forced to engage on it. As a result the pressure of population on agricultural operations both for employment and livelihood is still large and increasing consistently in absolute terms. But, examining the concentration of labourforce in different economic sectors it is well depicted the fact that the proportion of labourforce in agricultural activities has been consistently declining and its shift has directly been observed in tertiary sector of economies, particularly in the activities of information sector. It also revealed that the interest of farming communities in involving themselves in agricultural activities has been declining during the recent past. As is evident by the fact that net cultivated land area under the production of foodgrains has been consistently declining while the culturable waste land and the land as fallow have been increasing in the state for last over two decades. The net cultivated land area in 1982-83 was 703 thousand hectares, which has declined to 671 thousand hectares in 1987-88 and it remained only 663 thousand hectares in 1996-97.

Lacking irrigation facilities in the hilly areas of the state has been visualized as the serious problems behind the poor performance of production and stagnation in yield rates of the major foodgrains. The potentials of water in the hilly areas of the state are inadequately exploited. On account of undulating topography and hard rock strata augmenting water resources and bringing additional land area under the facility of irrigation is a much difficult task. The depletion of water resources has also been increasingly been visualized due to decreasing rate of forest cover. The forest cover area in the state was 82.11 per cent of the total geographical area in 1982-83, which has reduced to 63.95 per cent in 1996-97. The studies undertaken in the past also indicates that due to increasing deforestation, in a little less than 50 per cent villages, springs have either used to yield

**TABLE 1 : LAND USE PATTERN**

(Area in Hectares)

<b>LAND USE</b>	<b>1982-83</b>	<b>1987-88</b>	<b>1996-97</b>
1. Total Reportd Area	<b>5322</b> (100.00)	<b>5376</b> (100.00)	<b>5362</b> (100.00)
2. Forest Area	<b>4370</b> (82.11)	<b>3424</b> (63.69)	<b>3429</b> (63.95)
3. Barren and Culturable Waste	<b>606</b> (11.39)	<b>6 18</b> (11.50)	<b>615</b> (11.47)
4. Land under non-agri. Use	<b>119</b> (2.23)	<b>125</b> (2.33)	<b>138</b> (2.57)
5. Permanent Pasture and Grazing Land	<b>217</b> (408)	<b>277</b> (5.15)	<b>227</b> (4.23)
6. Land under Miscellaneous Trees and Grovers	<b>185</b> (3.48)	<b>209</b> (3.89)	<b>218</b> (4.06)
7. Current Fallow	<b>20</b> (0.38)	<b>12</b> (0.22)	<b>7</b> (0.13)
8. Other Fallow	<b>33</b> (0.62)	<b>45</b> (0.84)	<b>64</b> (1.19)
9. Net sown area	<b>703</b> (13.21)	<b>671</b> (12.48)	<b>663</b> (12.36)
10. Net Irrigated Area	<b>207</b> (29.45)	<b>248</b> (36.96)	<b>238</b> (35.90)

Source: Directorate of Agriculture, U.P., Lucknow.

water or sprout water only during rainy season when already sufficient rain or surface water is available. Decrease in spring discharge ranging from 25 per cent to 75 per cent and resulting in spring fed rivers have gone down to 30 to 40 per cent in the past one decade or two. Indeed most of the lesser Himalayan rivers and streams are affiliated with too little to much syndrome. As the consequences of emerging these underlined problems of water scarcity the net irrigated land area has been declining for last over one decade. The irrigated land area has declined from 671 thousands hectares to 663 thousands hectares between the period 1987-88 to 1996-97, showing a decrease of one thousand hectares during every year.

## CROPPING PATTERN

The main agricultural crops grown in Uttarakhand are paddy, sawan, maize and madua during the kharif crop season and wheat and Barley during the Rabi crop seasons. However, the pulses and vegetable are grown during both the crops seasons. The crops such as paddy, pulses and the different types of vegetables are mostly grown in the irrigated land areas and in valley areas. Remaining crops are generally grown in high reaches where irrigation facilities are not available.

However, the utilisation of available land for the production of major foodgrains has been remarkably declining over the years. This is basically due to the fact that during recent past the farmers have increasingly been well aware about the economic use of their available lands. The farmers are visualised preferring to utilise their farms for the production of high value crops such as fruits, potato and off season vegetables instead of using it under the production of traditional low value crops so as to maximise economic returns from their small farms. As a result, the land area under the production of these high value crops, including pulses has been considerably increasing while it has been decreasing under the traditionally grown low value crops such as wheat and paddy.

The decline in area under traditional crops has been relatively higher during kharif crop season as compared to Rabi crop seasons because the former crop season comprises of rainy period. During kharif season, the farmers are putting a sizeable land area under the rainy period. During kharif season, the farmers are putting a sizeable land area under the production of off season vegetables and pulses, such as soyabean. The vegetables such as onion and peas are grown during Rabi crop season but the Potato is grown in both the seasons. As a result, it revealed that utilization of land under the production of

**TABLE 2 : CROPPING PATTERN**

CROP	Land Area (000 Hects)		Percentage Change	Annual Change
	1992-93	1997-98		
Paddy	259	258	-0.39	-0.07
Madua	139	137	-1.44	-0.24
Sawan	75	72	-4.00	-0.67
Maize	29	31	+6.90	1.15
Wheat	358	340	-5.03	-0.84
Barley	28	27	-3.70	-0.62
Pulses	29	31	+6.90	1.15
Other Crops	2	2	--	--
All Foodgrains	919	897	-2.39	-0.40
Fruits	179	187	4.47	0.75
Vegetables	78	85	8.97	1.50
Others	51	56	9.80	1.63
All Crops	1288	1256	2.48	0.41

traditional crops during the kharif season has declined by around 10 per cent as against 8 per cent for Rabi crops, but, it has increased to 6.90 per cent for pulses which are grown in both the crop seasons. Between the period of last six years, the land utilisation under the production of wheat during Rabi Crop season and of Sawan, during kharif crop season has declined at highest proportion of around 5 per cent and 4 per cent respectively.

The area under the production of pulses has increased from 29 thousand hectares to 31 hectares thousands during 1992-93 to 1997-98 as a result of shifting land use, particularly from the cultivation of Madua, Sawan and Barley, which are mainly grown in un-irrigated lands in middle and high mountain areas, to the cultivation of Soyabean and some other local varieties of pulses. Thus, despite small size of holdings, a good number of farming households have opted for a shift from production of low value foodgrains to the cultivation of high value commercial crops, particularly vegetables and pulses.

Average yield rates of major foodgrains in Uttarakhand are 1.61 tonnes/hectares but are still much lower in purely hilly districts, mostly ranging between 0.10 and 1.3 tonnes/hectares. Using various indicators of development such as cropping intensity, gross value of agricultural produce per hectare of net and gross area sown and productivity level of various crops it is further revealed that the level of agricultural development in Uttarakhand is quite unreal and misleading. Included in the nine districts of the state are Nainital, Udham Singh Nagar, Haridwar and Dehradun which have substantial plain and fertile land area and rank among the most developed districts. When the agricultural development of these four districts is excluded from the other purely hilly districts the scenario together changes. The hilly area of the state emerges as one of the agriculturally backward region of the state. The cropping intensity in the purely hilly districts continue to remain higher than the other three districts while the agricultural development emerges to be the least there. Thus, in real sense, the crop cultivation is extremely intensive but returns from it are extremely low.

**TABLE 3 : PRODUCTION AND YIELD RATES OF MAJOR FOODGRAINS**  
(Prod. Tonnes and Yields. Qt./Hect.)

<b>MAJOR CROPS</b>	<b>PRODUCTION</b>		<b>YIELD RATES</b>	
	1992-93	1997-98	1992-93	1997-98
PADDY	513	502	19.79	19.46
MADUA	176	179	12.66	13.03
WHEAT	608	634	16.96	18.65
BARLEY	349	296	12.60	10.96
TOTAL PULSES	19	22	6.58	7.04
ALL FOOD GRAINS	1474	1493	16.05	16.63

By and large the structures of production and yield rates of major foodgrains are showing marginal increase at the state level during the recent past. But this has mainly reflected due to higher volume of crop production and generally higher yield rates of foodgrains achieved in four agriculturally developed districts which larger land area is very fertile and over 75 per cent of its cultivated land have the facility of irrigation. However, in purely hilly districts, stagnation in the productivity of foodgrains has been well recognised since last one decade. The total production of foodgrain is estimated to be 1493 thousand tonnes and it is increasing at the rate of 0.22 per cent. In purely hilly areas of the state, the low level of irrigation facilities, lack of improvements in farming technology as suited to terraced farming and unsuitability of land for the use of modern inputs have been the major factor behind the slow increase in crop productivity. The per hectare consumption of fertilizers is noted to be 44.08 kg. Per hectare in 1997-98, consisting 32.63 kg/hec. Nitrogen, 8.13 kg/hect. Phosphet and 3.2 kg/hec. Potash. However, the real fact is that in purely hilly districts the per hectare use of all category of fertilizers together is only 8 kg which is comparatively much less than most of the hilly states of India, such as Himachal Pradeh (29.17 kg), Jammu and Kashmir (39.15 kg) and Manipur (47.42 kg).

### **SUMMING UP**

The agriculture has been the main economic activity of people living in Uttarakhand for the past several centuries. Still, a majority of labourforce of 65 per cent and 92 per cent population is depending on agricultural activities both for livelihood and employment. However, the concentration workforces in agricultural activities have been declining over the years and its shift has been well seen in informal sector activities of tertiary economies. The cultivated land area have also been declining partly due to changes occurred in the land use pattern for different purposes during the recent past and partly

due to decreasing interest of local people to engage in agricultural operations, (because carrying out agricultural activities provide very low level of irregular earnings), increasing rate of outmigration of male workforce and decreasing share of agriculture in the incomes of farming households. In addition to this the farmers are providing increasing interest in utilising more fertile, productive and irrigated land areas in general and its utilisation under the production of high value crops in particular so as to maximise high return from the small size of land holdings available with them. As the consequences, the land area under the production of major traditional food crops is significantly decreasing during both kharif and Rabi crop seasons while it has been remarkably increasing in the cultivation of high value commercial crops such as pulses (mainly Soyabeen), fruits and different variety of off season vegetables in almost the districts, more especially in hilly areas. It is noticed that increasing development of basic infrastructural facilities, basically improvements in access to transport and communication facilities in most of the areas and increase in general demand conditions for various market goods among the people have been increasingly motivating them to initiate for bringing possible changes in the cropping pattern so as to increase personal income level, for satisfying their increasing demands for market goods.

Providing increasing emphasis on exploiting the various water resources and bringing possible improvements in the management of water distribution could be a instrumental option for bringing additional land area under the production of different crops such that the total volume of production and productivity level of foodgrains could be increased at substantial level. Since, around 18 per cent of the geographical land area has been reported as pasture land, cultivable waste and permanent fallow land in the state which can be used for cultivation through developing the irrigation facilities.

Increasing emphasis should also be provided towards the diversification of agriculture through motivating the farmers for changing cropping pattern. Since it is evident that the farming community has become quite aware of the fact that a shift from the production of low value crops to relatively high value crops on available land has significant advantages in terms of higher returns. Therefore, the mobilisation of public support for this purpose would not be difficult, but they are hesitant to adopt changes because of high production costs and market risks. Therefore, it would be necessary to provide easy access to support services, such as seeds, fertilizers, production techniques, improved agriculture devices and methods and marketing infrastructure in order to increase yield levels and minimise the risks involved in the shift from food centred subsistence production to niche based commercial crops.

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